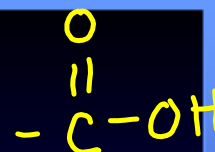


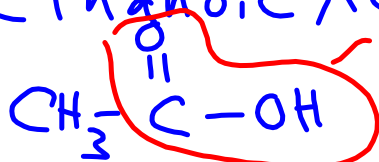
Carboxylic Acids



- Also have a carbonyl group (C=O), but is also attached to a hydroxyl group (-OH) = "carboxyl" group
- general formula: R-COOH
 - weak acids (ionize slightly)
- Named by replacing -e with -oic and followed by the word acid
- methanoic acid; ethanoic acid

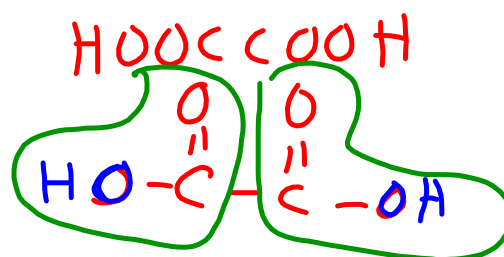


Ex: Ethanoic Acid



acetic acid CH_3COOH

Oxalic acid



METHANOIC ACID or Formic Acid
(ant bites / nettles)

ETHANOIC ACID or Acetic Acid (vinegar)

PROPANOIC ACID or Butyric Acid
(rancid butter)



Oxalic Acid - the poison in Rhubarb
leaves or ingredient in commercial rust
remover and brass cleaners

Citric Acid

CH₂-COOH

HO-C-COOH

CH₂--COOH

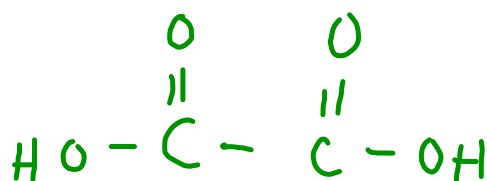
Handwritten chemical structures:

$$\text{H}-\overset{\text{O}}{\parallel}{\text{C}}-\text{OH}$$

$$\text{CH}_3-\text{CH}_2-\overset{\text{O}}{\parallel}{\text{C}}-\text{OH}$$

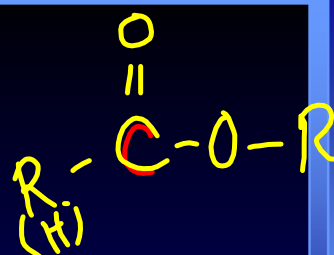
$$\text{HO}-\overset{\text{O}}{\parallel}{\text{C}}-\overset{\text{O}}{\parallel}{\text{C}}-\text{OH}$$

Handwritten formula for Oxalic Acid: $\text{HOOC}-\text{COOH}$



Esters

- General formula: RCOOR
- Derivatives of the carboxylic acids, in which the $-\text{OH}$ from the carboxyl group is replaced by an $-\text{OR}$ from an alcohol:
 $\text{carboxylic acid} + \text{alcohol} \rightarrow \text{ester} + \text{water}$
Esterification Reaction
- many esters have pleasant, fruity odors—
banana, pineapple, perfumes

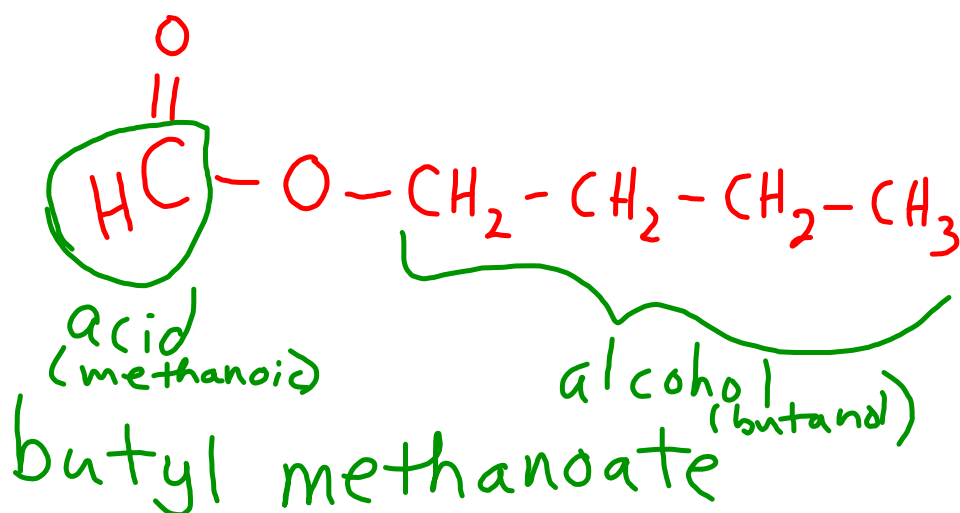


Esters

- Naming? It has 2 words:

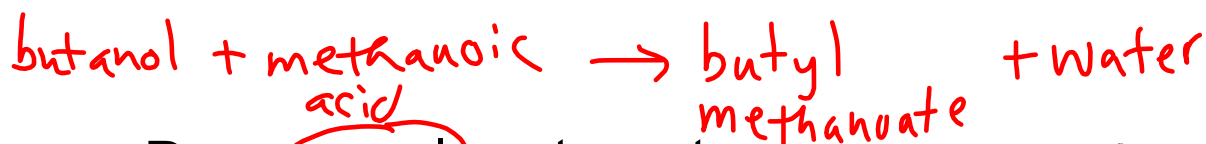
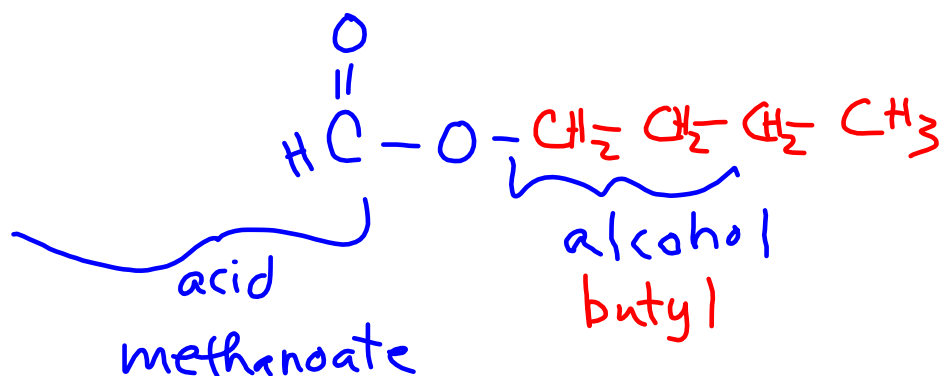
→ 1st: alkyl attached to single bonded oxygen from alcohol

→ 2nd: take the acid name, remove the -ic acid, add -ate

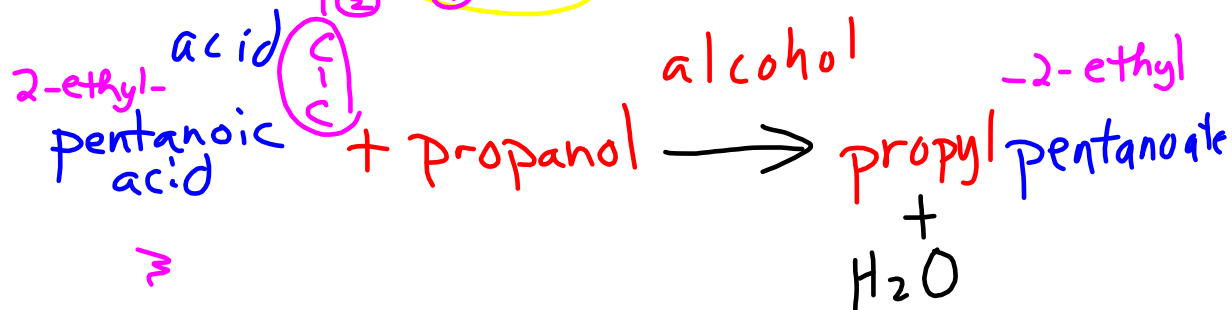
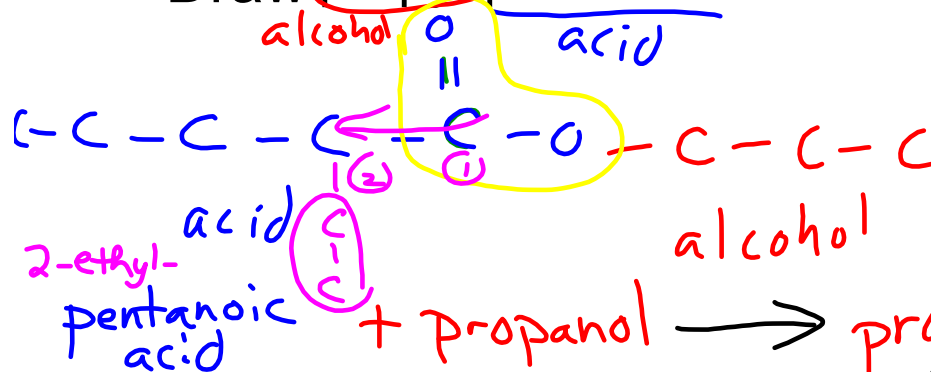


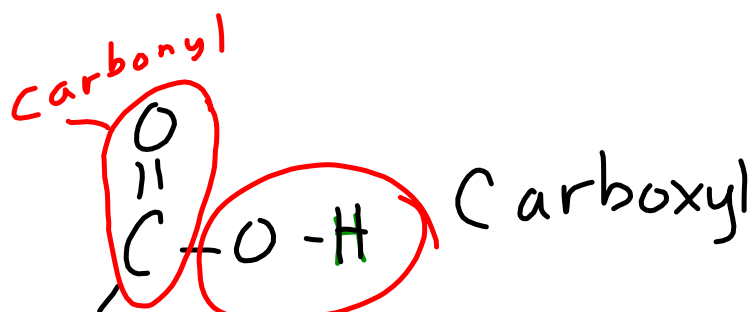
methyl propanoate

Draw butyl methanoate

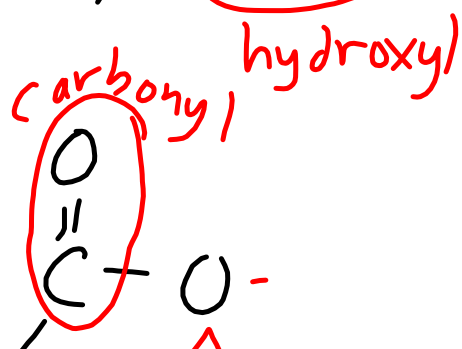


Draw propyl pentanoate





Carboxylic acids



Esters

Esters

